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/3

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *12 November 2003*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-26* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-26* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: ____.

DETAILED ACTION

Response to Amendment

1.   The amendment filed on 11/12/2003 has been entered. Claim 1 has been amended.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed
> in the United States before the invention by the applicant for patent or (2) a patent granted on an application for
> patent by another filed in the United States before the invention by the applicant for patent, except that an
> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this
> subsection of an application filed in the United States only if the international application designated the United
> States and was published under Article 21(2) of such treaty in the English language.

3.   Claims 1-4, 6-7, 9-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Duluk

et al. U.S. Pat. No. 6,664,959 (hereinafter Duluk).

4.   Claim 1:

Duluk teaches a system for identifying pixels inside a graphics primitive of a raster image

comprising:

A memory for storing a raster image (e.g., figures 1-12);

A graphics engine coupled to the memory and comprising a pipeline structure configured

for both sequential and parallel processing (e.g., column 37), the pipeline structure receiving

information related to polygonal portions of the raster image from the memory and information

related to graphics primitives from a source for determining whether a polygonal portion of the

raster image is at least partly inside the graphics primitive (e.g., column 30 and 37).

Claim 2:

The claim 2 encompasses the same scope of invention as that of claim 1 except additional

claimed limitation of a predetermined number of sequential logic circuits and a predetermined

number of parallel logic circuits. However, Duluk further discloses the claimed limitation of a

predetermined number of sequential logic circuits and a predetermined number of parallel logic

circuits (e.g., column 37).

Claim 3:

The claim 3 encompasses the same scope of invention as that of claim 1 except additional

claimed limitation of the pipeline structure dividing the polygonal portion into a predetermined

number of polygonal sub-portions if the polygonal portion is at least partly inside the graphics

primitive. However, Duluk further discloses the claimed limitation of the pipeline structure

dividing the polygonal portion into a predetermined number of polygonal sub-portions if the

polygonal portion is at least partly inside the graphics primitive (e.g., column 30)

Claim 4:

The claim 4 encompasses the same scope of invention as that of claim 1 except additional

claimed limitation of the pipeline structure determining whether the polygonal portion of the

raster image is at least partly inside the graphics primitive by evaluation of edge function of the

graphics primitive. However, Duluk further discloses the claimed limitation of the pipeline

structure determining whether the polygonal portion of the raster image is at least partly inside the

graphics primitive by evaluation of edge function of the graphics primitive (e.g. column 30).

Claim 6:

The claim 6 encompasses the same scope of invention as that of claim 4 except additional claimed limitation of the edge function being evaluated at a corner vertex of the polygonal portion, the corner vertex being farthest in a positive direction from a primitive edge associated with the edge function. However, Duluk further discloses the claimed limitation of the edge function being evaluated at a corner vertex of the polygonal portion, the corner vertex being farthest in a positive direction from a primitive edge associated with the edge function (e.g., column 30).

Claim 7:

The claim 7 encompasses the same scope of invention as that of claim 2 except additional claimed limitation of the pipeline structure being configured such that the sequential logic circuits are coupled together in series followed by the parallel logic circuits coupled together in parallel. However, Duluk further discloses the claimed limitation of the pipeline structure being configured such that the sequential logic circuits are coupled together in series followed by the parallel logic circuits coupled together in parallel (e.g., column 37).

Claim 9:

The claim 9 encompasses the same scope of invention as that of claim 3 except additional claimed limitation of the pipeline structure determining the two polygonal sub-portions by determining midpoint values of two opposite sides of the polygonal portion of the raster image and using the midpoint values as vertices of the two polygonal sub-portions. However, Duluk further discloses the claimed limitation of the pipeline structure determining the two polygonal

sub-portions by determining midpoint values of two opposite sides of the polygonal portion of the

raster image and using the midpoint values as vertices of the two polygonal sub-portions ().

Claim 10:

The claim 10 encompasses the same scope of invention as that of claim 1 except

additional claimed limitation of the pipeline structure further comprising a predetermined number

of pixel engines for determining attribute values associated with each pixel. However, Duluk

further discloses the claimed limitation of the pipeline structure further comprising a

predetermined number of pixel engines for determining attribute values associated with each pixel

(e.g., column 46-47).

Claim 11:

The claim 11 encompasses the same scope of invention as that of claim 1 except

additional claimed limitation of the polygonal portion of a raster image having a width and a

height, each of the width and the height having a value of a power of 2^m. However, Larson

further discloses the claimed limitation of the polygonal portion of a raster image having a width

and a height, each of the width and the height having a value of a power of 2^m (e.g., 16 by 16

subpixels; see column 30).

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

6.   Claim 5 is rejected under 35 U.S.C. 103(a) as being as being unpatentable over Duluk et

al. U.S. Pat. No. 6,664,959 (hereinafter Duluk), in view of Larson U.S. Pat. No. 6,359,623

(hereinafter Larson).

Claim 5:

(1) The claim 5 encompasses the same scope of invention as that of claim 4 except

additional claimed limitation of each edge function of the graphics primitive being based on a

general edge function, $e(x,y) = e0 + Nx\ X + Ny\ Y$.

(2) However, Duluk does not implicitly teach each edge function of the graphics

primitive being based on a general edge function, $e(x,y) = e0 + Nx\ X + Ny\ Y$.

(3) Larson discloses the claimed limitation of each edge function of the graphics

primitive being based on a general edge function, $e(x,y) = e0 + Nx\ X + Ny\ Y$ (Larson column

12, lines 16-67, column 13, lines 1-51).

(4) It would have been obvious to one of ordinary skill in the art to have incorporated the

Larson's edge function into Duluk's method for determining whether the corners of the regions

are within, outside, or fully inside a graphical primitive because Duluk suggests determining

whether a tile within a graphics primitive (Duluk column 30) which involves calculating the left

most and right most positions of the primitive in each subraster line that contains at least one

sample point and therefore the claimed limitation suggests an obvious modification of Duluk.

(5) One having the ordinary skill in the art would have been motivated to do this because

it would have provided an edge equation for determining whether a portion of tile is covered by a

graphics primitive.

7.   Claims 8 is rejected under 35 U.S.C. 103(a) as being as being unpatentable over Duluk et

al. U.S. Pat. No. 6,664,959 (hereinafter Duluk).

        Claim 8:

        (1) The claim 8 encompasses the same scope of invention as that of claim 2 except

additional claimed limitation of the pipeline structure comprising seven sequential logic circuits

connect in series and seven parallel logic circuits coupled together in a multi-stage pyramid

structure.

        (2) However, Duluk does not implicitly teach the pipeline structure comprising seven

sequential logic circuits connect in series and seven parallel logic circuits coupled together in a

multi-stage pyramid structure.

        (3) It would have been obvious to one of ordinary skill in the art to have altered the

number sequential logic circuits and parallel logic circuits in the pipeline structure of Duluk's

method because Duluk suggests multiple number of sequential and parallel logic circuits (Duluk

column 37) and therefore the claimed limitation suggests an obvious modification of Duluk.

        (4) One having the ordinary skill in the art would have been motivated to do this because

it would have changed the number of sequential and parallel logic circuits of the Duluk's

pipeline structure.

8.   Claims 12-26 are rejected under 35 U.S.C. 103(a) as being as being unpatentable over

Larson U.S. Pat. No. 6,359,623 (hereinafter Larson), in view of Greene et al. U.S. Patent No.

6,480,205 (hereafter Greene).

9.   Claim 12:

(1) Larson teaches a method for identifying pixels inside a graphics primitive of a raster

image (see the abstract, figures 6-10) comprising the steps of:

(a) Determining whether a polygonal portion of the raster image is at least partly inside

the graphics primitive using a coordinate reference frame located at a point of the polygonal

portion (e.g., column 3, lines 5-67; column 4, lines 1-17);

(b) Dividing the polygonal portion of the raster image into a predetermined number of

polygonal subportions if the polygonal portion of the raster image is at least partly inside the

graphics primitive (column 11, lines 1-16);

(c) Determining whether each polygonal sub-portion of the raster image is at least partly

inside the graphic primitive (column 11, lines 1-16);

(d) Further dividing the polygonal sub-portion into a predetermined number of polygonal

sub-portions if the polygonal sub-portion is at least partly inside the graphics primitive and is

larger than a pixel (figure 4, column 11, lines 1-16).

(2) However, Larson does not implicitly teach using a coordinate reference frame located

at the reference point (x^*, y^*) of figure 11 which must necessarily be the same as the geometric

center (point) of a region or a tile or a portion or an area corresponding to the portion of the

claimed invention.

(3) Greene teaches implicitly a reference frame located at a geometric center of the tile (See Figure 2 of Greene wherein one of the reference frame points can be chosen to center on the tile of Figure 2).

(4) It would have been obvious to one of ordinary skill in the art to have incorporated the Greene's selection of the reference frame centering on the geometric center of the tile into Larson's method for determining whether the corners of the regions are within, outside, or fully inside a graphical primitive because Larson suggests selecting a reference frame (Larson figure 11) with a reference point that may be the geometric center of the regions (Larson column 11, lines 1-15; See figure 2 of Greene wherein the reference frame on the left side of the reference frame 224 is located at the geometric center of the tile 212) and therefore the claimed limitation suggests an obvious modification of Larson.

(5) One having the ordinary skill in the art would have been motivated to do this because it would have provided a reference frame that permits the equations to be evaluated with shifts and adds (Greene column 21, lines 59-67; column 22, lines 1-45).

Claim 13:

The claim 13 encompasses the same scope of invention as that of claim 12 except additional claimed limitation of recursively performing (c) and (d) until no more polygonal sub-portions that are at least partly inside the graphics primitive. However, Larson further discloses the claimed limitation of recursively performing (c) and (d) until no more polygonal sub-portions that are at least partly inside the graphics primitive (figure 4, column 11, lines 1-16).

Claim 14:

The claim 14 encompasses the same scope of invention as that of claim 12 except additional claimed limitation that determining step (a) further comprises the step of receiving a plurality of values for corner vertices of the polygonal portion and arithmetic edge functions related to the graphic primitive having a coordinate reference frame located at a geometric center of the polygonal portion, the arithmetic edge function corresponding to an edge of the graphics primitive. However, Larson further discloses the claimed limitation of that determining step (a) further comprises the step of receiving a plurality of values for corner vertices of the polygonal portion and arithmetic edge functions related to the graphic primitive having a coordinate reference frame located at a geometric center of the polygonal portion, the arithmetic edge function corresponding to an edge of the graphics primitive (figure 4, column 11, lines 1-67, column 12, lines 1-67, column 13, lines 1-51).

Claim 15:

The claim 15 encompasses the same scope of invention as that of claim 14 except additional claimed limitation that the determining step (a) further comprises the step of evaluating an arithmetic edge function received at a corner vertex of the polygonal portion, the corner vertex being farthest in a positive direction relative to the corresponding edge of the graphics primitive.

However, Larson further discloses the claimed limitation of that the determining step (a) further comprises the step of evaluating an arithmetic edge function received at a corner vertex of the polygonal portion, the corner vertex being farthest in a positive direction relative to the corresponding edge of the graphics primitive (figure 4, column 11, lines 1-67, column 12, lines 1-67, column 13, lines 1-51).

Claim 16:

The claim 16 encompasses the same scope of invention as that of claim 15 except additional claimed limitation of the polygonal portion being at least partly inside the graphics primitive if all arithmetic edge functions evaluated being positive. However, Larson further discloses the claimed limitation of the polygonal portion being at least partly inside the graphics primitive if all arithmetic edge functions evaluated being positive (figure 4, column 11, lines 1-67, column 12, lines 1-67, column 13, lines 1-51).

Claim 17:

The claim 17 encompasses the same scope of invention as that of claim 12 except additional claimed limitation that the dividing step (b) further comprises the step of dividing the polygonal portion into two polygonal sub-portions by determining midpoint values of two opposite sides of the polygonal portion. However, Larson further discloses the claimed limitation that the dividing step (b) further comprises the step of dividing the polygonal portion into two polygonal sub-portions by determining midpoint values of two opposite sides of the polygonal portion (figure 4, column 11, lines 1-67, column 12, lines 1-67, column 13, lines 1-51).

Claim 18:

The claim 18 encompasses the same scope of invention as that of claim 12 except additional claimed limitation that the dividing step (b) further comprises the step of sequentially deriving two new sets of arithmetic edge functions associated with a translated coordinate reference frame located at a geometric center of a corresponding one of the polygonal sub-portions. However, Larson further discloses the claimed limitation that the dividing step (b) further comprises the step of sequentially deriving two new sets of arithmetic edge functions

associated with a translated coordinate reference frame located at a geometric center of a

corresponding one of the polygonal sub-portions (figure 4, column 11, lines 1-67, column 12,

lines 1-67, column 13, lines 1-51).

Claim 20:

The claim 20 encompasses the same scope of invention as that of claim 12 except

additional claimed limitation of an electronic readable medium having embodied thereon a

program. However, Larson further discloses the claimed limitation of an electronic readable

medium having embodied thereon a program (e.g., figure 9, column 9, lines 62-67, column 10,

lines 1-6, column 17, lines 1-9).

Claim 21:

The claim 21 encompasses the same scope of invention as that of claim 20 except

additional claimed limitation of recursively performing (c) and (d) until no more polygonal sub-

portions that are at least partly inside the graphics primitive. However, Larson further discloses

the claimed limitation of recursively performing (c) and (d) until no more polygonal sub-portions

that are at least partly inside the graphics primitive (figure 4, column 11, lines 1-16).

10.   Claim 22:

(1) Larson teaches a method of identifying pixels inside a graphics primitive of a raster

image (see the abstract, figures 6-10) comprising the steps of:

(a) Selecting a tile including a pixel (column 10, lines 42-54);

(b) Determining if a portion of the tile is within the graphics primitive (column 10, lines 55-67, column 11, lines 1-16);

(c) Dividing the tile into sub-tiles if a portion of the tile is within the graphics primitive (column 11, lines 1-16);

(d) Recursively dividing each sub-tile having a portion within the graphics primitive until the sub-tile is equal in size to a pixel (figure 4, column 11, lines 1-16).

(2) However, it is not clear whether Larson implicitly teaches the claimed limitation of defining a coordinate reference frame located at a geometric center of the tile.

(3) Greene teaches implicitly a reference frame located at a geometric center of the tile (See Figure 2 of Greene wherein one of the reference frame points can be chosen to center on the tile of Figure 2).

(4) It would have been obvious to one of ordinary skill in the art to have incorporated the Greene's selection of the reference frame centering on the geometric center of the tile into Larson's method for determining whether the corners of the regions are within, outside, or fully inside a graphical primitive because Larson suggests selecting a reference frame (figure 11) with a reference point that may be the geometric center of the regions (Larson column 11, lines 1-15) and therefore the claimed limitation suggests an obvious modification of Larson.

(5) One having the ordinary skill in the art would have been motivated to do this because it would have provided a reference frame that permits the equations to be evaluated with shifts and adds (Greene column 21, lines 59-67; column 22, lines 1-45).

Claim 23:

The claim 23 encompasses the same scope of invention as that of claim 22 except

additional claimed limitation of the step of disregarding the tile or sub-tile from subsequent

decomposition if the tile or sub-tile being outside of the graphics primitive. However, Larson

further discloses the claimed limitation of the step of disregarding the tile or sub-tile from

subsequent decomposition if the tile or sub-tile being outside of the graphics primitive (column

10, lines 55-67).

Claim 24:

The claim 24 encompasses the same scope of invention as that of claim 22 except

additional claimed limitation that the step of determining further comprises evaluating the tile at a

corner vertex which is farthest in a positive direction relative to a current edge of the graphics

primitive. However, Larson further discloses the claimed limitation that the step of determining

further comprises evaluating the tile at a corner vertex which is farthest in a positive direction

relative to a current edge of the graphics primitive (column 10, lines 55-67).

Claim 25:

The claim 25 encompasses the same scope of invention as that of claim 22 except

additional claimed limitation that the step of recursively dividing further comprises determining if

the sub-tile is at least partly within the graphics primitive by evaluating the sub-tile at a corner

vertex which is farthest in a positive direction relative to a current edge of the graphics primitive.

However, Larson further discloses the claimed limitation that the step of recursively dividing

further comprises determining if the sub-tile is at least partly within the graphics primitive by

evaluating the sub-tile at a corner vertex which is farthest in a positive direction relative to a

current edge of the graphics primitive (column 10, lines 55-67).

11.   Claim 26:

The claim 26 encompasses the same scope of invention as that of claim 22 except

additional claimed limitation of an electronic readable medium having embodied thereon a

program. However, Larson further discloses the claimed limitation of an electronic readable

medium having embodied thereon a program (e.g., figure 9, column 9, lines 62-67, column 10,

lines 1-6, column 17, lines 1-9).

Remarks

12.   Applicant's arguments, filed 11/12/2003, paper number 10, have been fully considered

but they are not deemed to be persuasive.

13.   Applicant argues in essence with respect to the amended claim 1 and similar claims that:

"...Applicants are amending claim 1 to include in part...a pipeline structure configured

for both sequential and parallel processing."

This is not found persuasive because the examiner asserts that Duluk teaches a pipeline structure

configured for both sequential and parallel processing (e.g., column 37). Therefore, Duluk

fulfills the claimed limitation set forth in the amended claim 1 and similar claims.

14.   Applicant argues in essence with respect to claim 12 and similar claims that:

"Applicants submit that it clear that Greene et al.'s coordinate reference frames are not

located at the geometric center of the corresponding tiles, and thus Greene et al. does not

disclose 'using a coordinate reference frame located at a geometric center of the

polygonal portion'."

This is not found persuasive because the examiner asserts that Larson teaches a method of

determining whether a polygonal portion of a raster image is at least partly inside a graphics

primitive, in which a coordinate reference frame is located at a point of the polygonal portion

(see for example Larson column 12, lines 54-67; column 13, lines 1-65). Greene further teaches

that the reference frame can be selected at the geometric center of the polygonal portion (See

figure 2 wherein the reference frame on the left side of the reference frame 224 is located at the

geometric center of the tile 212). Therefore, Larson/Greene fulfills the claimed limitation set

forth in claim 12 and similar claims.

Conclusion

15.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Jin-Cheng Wang whose telephone number is (703) 605-1213.

The examiner can normally be reached on 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 308-6606 for regular

communications and (703) 308-6606 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding

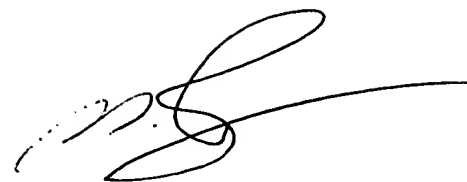should be directed to the receptionist whose telephone number is (703) 395-3900.

Art Unit: 2672

jcw
January 20, 2004

MICHAEL RAZAVI
PATENT EXAMINER
2600